



FCC Test Report

APPLICANT : Lenovo(Shanghai) Electronics Technology Co., Ltd.
EQUIPMENT : Motion controller
BRAND NAME : Lenovo
MODEL NAME : Lenovo C1610
FCC ID : O57C1610
STANDARD : 47 CFR Part 15 Subpart B
CLASSIFICATION : Certification
TEST DATE(S) : Jan. 31, 2023

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia



Approved by: Jason Jia

Sporton International Inc. (Kunshan)

**No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China**



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC310602	Rev. 01	Initial issue of report	Mar. 01, 2023



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
-	15.107	AC Conducted Emission	< 15.107 limits	Not Applicable	The EUT is powered by Battery only.
3.1	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 15.44 dB at 776.90 MHz

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1. General Description

1.1. Applicant

Lenovo(Shanghai) Electronics Technology Co., Ltd.

Section 304-305, Building No. 4, # 222, Meiyue Road, China (Shanghai) Pilot Free Trade Zone

1.2. Manufacturer

Lenovo PC HK Limited

23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong, China

1.3. Product Feature of Equipment Under Test

Product Feature	
Equipment	Motion controller
Brand Name	Lenovo
Model Name	Lenovo C1610
FCC ID	O57C1610
EUT supports Radios application	Bluetooth BLE (Nordic)
SN	1789063700055
HW Version	SIT
SW Version	v2.5
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two samples: left controller and right controller. The two samples are exactly same in the HW/SW portion, only the shell is different.

1.4. Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	Bluetooth: 2400 MHz ~ 2483.5 MHz
Rx Frequency	Bluetooth: 2400 MHz ~ 2483.5 MHz
Antenna Type	Bluetooth : PIFA Antenna
Type of Modulation	Bluetooth LE : GFSK

1.5. Modification of EUT

No modifications are made to the EUT during all test items.



1.6. Test Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH02-KS	CN1257	314309

1.7. Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH02-KS	AUDIX	E3	6.2009-8-24a

1.8. Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 15 Subpart B
- ♦ ANSI C63.4-2014

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

2. Test Configuration of Equipment Under Test

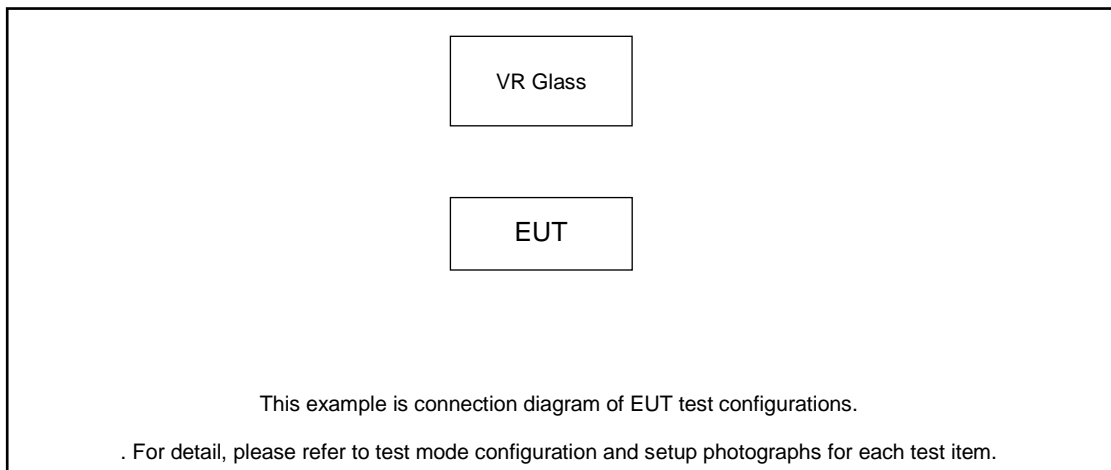
2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: radiation emission (30MHz to the 5th harmonic of the highest frequency or to 40 GHz, whichever is lower).

Test Items	Function Type
Radiated Emissions	Mode 1 : Motion controller(Left & Right) BLE Idle With VR glasses

2.2.Connection Diagram of Test System



The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application

2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	VR glass	Lenovo	Aurora	N/A	N/A	N/A

2.4. EUT Operation Test Setup

The Motion controller(L&R) is set BLE Idle with VR glasses.



3. Test Result

3.1. Test of Radiated Emission Measurement

3.1.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

<Class B Limit>

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.1.2. Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

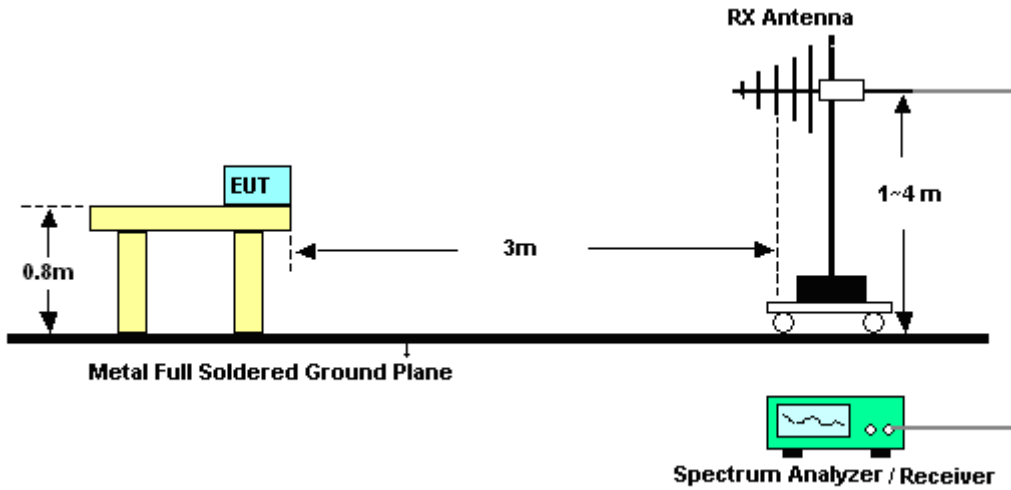


3.1.3. Test Procedures

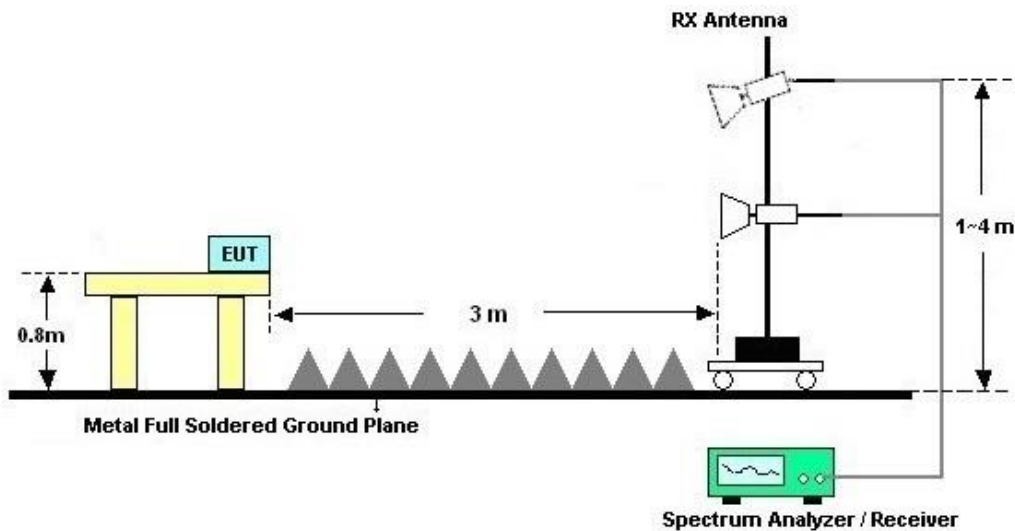
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dB μ V/m) = 20 log Emission level (μ V/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
10. Exploratory radiated emissions testing of handheld and/or body-worn devices shall include rotation of the EUT through three orthogonal axes (X/Y/Z Plane) to determine the orientation (attitude) that maximizes the emissions.

3.1.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



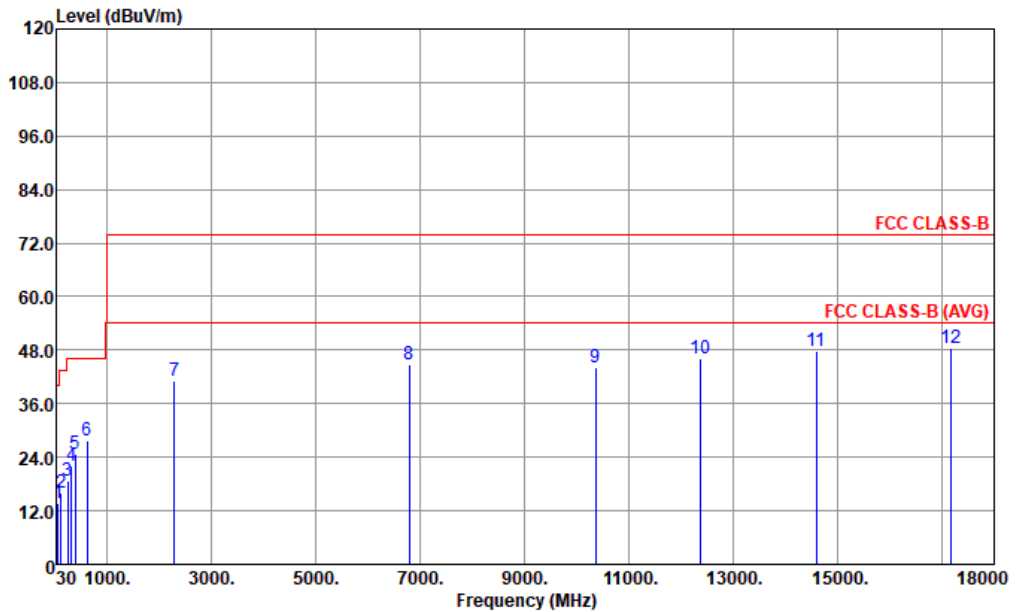
For radiated emissions above 1GHz





3.1.5. Test Result of Radiated Emission

Test Engineer :	Feng	Temperature :	24~25°C
		Relative Humidity :	41~42%
Test Distance :	3m	Polarization :	Horizontal

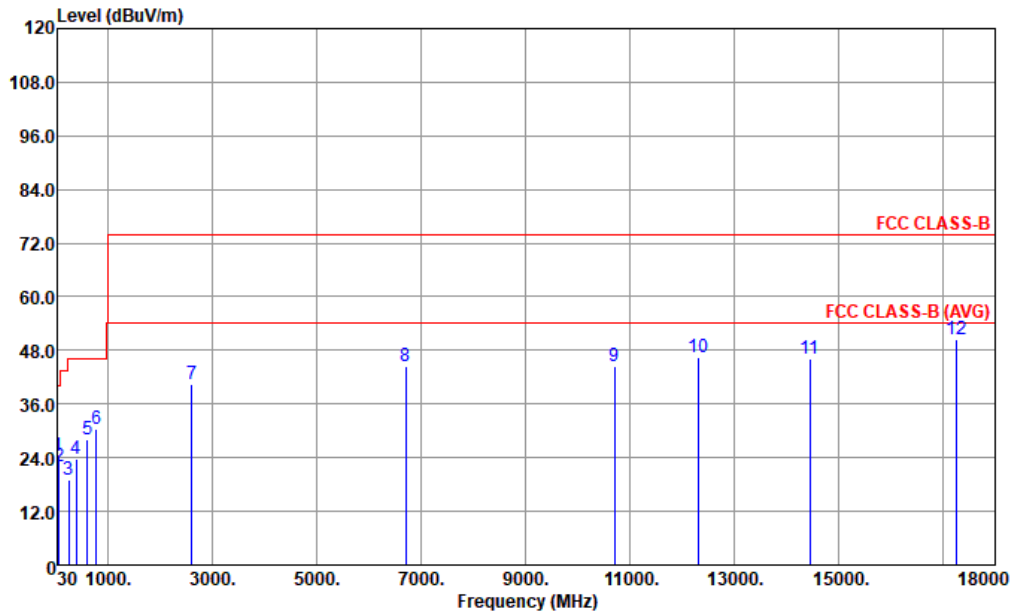


Site : 03CH02-KS
 Condition : FCC CLASS-B 3m LF 49921 HORIZONTAL

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	70.740	13.67	-26.33	40.00	29.47	15.41	1.19	32.40	---	---	Peak
2	127.000	16.18	-27.32	43.50	29.36	17.55	1.67	32.40	---	---	Peak
3	255.040	18.77	-27.23	46.00	29.92	19.11	2.14	32.40	---	---	Peak
4	323.910	21.93	-24.07	46.00	31.73	19.95	2.65	32.40	---	---	Peak
5	390.840	24.88	-21.12	46.00	32.68	21.65	2.95	32.40	---	---	Peak
6	622.670	27.91	-18.09	46.00	30.32	26.31	3.68	32.40	---	---	Peak
7	2292.000	41.16	-32.84	74.00	37.61	31.14	7.22	34.81	---	---	Peak
8	6797.000	44.93	-29.07	74.00	29.73	35.17	12.82	32.79	---	---	Peak
9	10367.000	44.13	-29.87	74.00	24.61	38.47	16.20	35.15	---	---	Peak
10	12373.000	46.18	-27.82	74.00	24.19	39.72	17.80	35.53	---	---	Peak
11	14600.000	47.90	-26.10	74.00	22.86	40.93	19.29	35.18	---	---	Peak
12	17184.000	48.62	-25.38	74.00	21.36	41.24	21.09	35.07	---	---	Peak



Test Engineer :	Feng	Temperature :	24~25°C
		Relative Humidity :	41~42%
Test Distance :	3m	Polarization :	Vertical



Site : 03CH02-KS
 Condition : FCC CLASS-B 3m LF 49921 VERTICAL

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	48.430	24.43	-15.57	40.00	40.40	15.45	0.98	32.40	---	---	Peak
2	66.860	22.07	-17.93	40.00	38.76	14.56	1.15	32.40	---	---	Peak
3	255.040	19.12	-26.88	46.00	30.27	19.11	2.14	32.40	---	---	Peak
4	395.690	23.61	-22.39	46.00	31.26	21.77	2.98	32.40	---	---	Peak
5	611.030	28.24	-17.76	46.00	30.73	26.25	3.66	32.40	---	---	Peak
6	776.900	30.56	-15.44	46.00	30.74	27.86	4.15	32.19	---	---	Peak
7	2615.000	40.29	-33.71	74.00	35.34	31.68	7.70	34.43	---	---	Peak
8	6712.000	44.43	-29.57	74.00	29.44	34.94	12.76	32.71	---	---	Peak
9	10707.000	44.41	-29.59	74.00	24.41	38.72	16.42	35.14	---	---	Peak
10	12322.000	46.36	-27.64	74.00	24.37	39.74	17.78	35.53	---	---	Peak
11	14447.000	46.00	-28.00	74.00	21.17	40.80	19.22	35.19	---	---	Peak
12	17252.000	50.64	-23.36	74.00	23.37	41.25	21.11	35.09	---	---	Peak

Note:

- Level(dBμV/m) = Read Level(dBμV) + Antenna Factor(dB/m) + Cable Loss(dB) - Preamp Factor(dB)
- Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)



4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Oct. 12, 2022	Jan. 31, 2023	Oct. 11, 2023	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz-44G,MAX 30dB	Oct. 12, 2022	Jan. 31, 2023	Oct. 11, 2023	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz-1GHz	Dec. 23, 2022	Jan. 31, 2023	Dec. 22, 2023	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 07, 2022	Jan. 31, 2023	Nov. 06, 2023	Radiation (03CH02-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 08, 2023	Jan. 31, 2023	Jan. 07, 2024	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	May 24, 2022	Jan. 31, 2023	May 23, 2023	Radiation (03CH02-KS)
Amplifier	EM	EM01G18G	060806	1GHz~18GHz	Oct. 12, 2022	Jan. 31, 2023	Oct. 11, 2023	Radiation (03CH02-KS)
Amplifier	MITEQ	EM18G40GGA	060851	18~40GHz	Jan. 05, 2023	Jan. 31, 2023	Jan. 04, 2024	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Jan. 31, 2023	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jan. 31, 2023	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jan. 31, 2023	NCR	Radiation (03CH02-KS)

NCR: No Calibration Required



5. Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.9dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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